Space Weather Forecast

Issued on Tuesday 4 February 2025 at 00:33 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Solar winds easing. Chance of a glancing blow from a CME (coronal mass ejection) Day 3 (06 Feb). Further Moderate-class flares expected, slight chance of a Strong flare.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was moderate over the past 24 hours, with frequent Moderate-class flares, most of which originated from the largest and most complex region in the northeast.

There are now ten active regions on the Earth-facing disc. The majority of the activity is from the broad cluster of sunspots which are beginning to cross the central disc from the northeast quadrant into the western hemisphere. These form a rather large and complex area of multiple bipolar active regions, with signs of magnetic interaction between the regions suggesting the ongoing potential for notable flares. The eastern-most of these regions continues to exhibit sustained growth, especially in the intermediate and trailer portions, with at least two complex magnetic configurations evident. The remaining spot groups are small and magnetically simple

A moderate flare at 02/2324 UTC from the complex active region in the northeast was followed by a faint CME (coronal mass ejection) from the southeast in imagery. This has been analysed to potential give a glancing blow at Earth on 06/0700UTC, although this is low confidence.

Solar Wind / Geomagnetic Activity: Solar winds showed a declining connection to a fast solar wind stream. Wind speeds were initially strong around 550 km/s, falling to around 450 km/s. The Interplanetary Magnetic Field was initially moderate but steadily fell to current weak levels. The north-south component was weakly positive throughout. Geomagnetic activity was Quiet (Kp 0-1).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Moderate activity is expected, with Moderate flares expected at times and a slight chance of isolated Strong flares, primarily from the regions in the north now approaching centre disc.

Solar Wind / Geomagnetic Activity: A CME (coronal mass ejection) may give a glancing blow with Earth on the morning of Day 3 (06 Feb), although this is low confidence. The potential for further

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CMEs is elevated.

Earth is still connected to a coronal hole, but with wind speeds continuing to decline, likely returning to background levels by Day 2 (05 Feb). Solar winds may return to slightly elevated or elevated levels for a time on Day 3 (06 Feb), following any potential CME arrival.

Generally Quiet to Unsettled (Kp 1-3) geomagnetic activity is expected as Earth continues to come out of the coronal hole high speed stream. Following any potential CME arrival on Day 3, there is a chance of seeing activity temporarily increase to give active or G1/Minor Storms (Kp4-5).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background levels. However, there is a slightly increasing risk of a rise through this period as the cluster of sunspots in the north move into the western hemisphere.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	No	5	5	30	10
Strong	**G3**	No	1	1	3	1
Severe	**G4**	No	1	1	1	0
Extreme	**G5**	No	1	1	1	0

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**R1-R2 (M Class)**	Yes	80	80	80	80
Very Active	**R3-R5 (X Class)**	No	20	20	20	20

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	20	20	25	30
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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